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# Equipment Room Volume

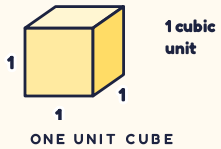
It's November, so football, hockey and basketball are all in season, and the made-up Cedar Falls Comets have a packed equipment room. **Volume** tells how much space a box takes up. Count cubes or multiply to solve.

Name _____

Date _____

## VOLUME TOOLKIT

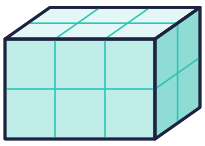
| Unit cube | Volume | V = l × w × h | V = B × h | Layers |
|---|---|---|---|---|
| 1 by 1 by 1 = 1 cubic unit | how many cubes fill a solid | length × width × height | B = area of the base (l × w) | cubes in one layer × number of layers |



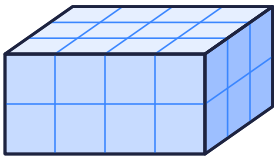
ONE UNIT CUBE

## COMETS EQUIPMENT ROOM · FIGURES FOR PROBLEMS 1–3

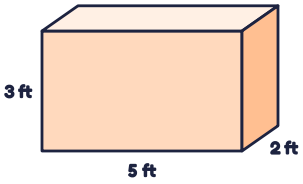
**Prism A**



**Prism B**



**Bin C**




ROOKIE

**1** Prism A is built from unit cubes. Some cubes are hidden in the back. How many cubes make **Prism A**?

WORK SPACE

_____ cubes

ROOKIE

**2** What is the volume of **Prism B**? Count the cubes in one layer, then count the layers.

WORK SPACE

_____ cubic units

STARTER

**3** Bin C holds the Comets' **football** pinnies. Use its labels to find its volume.

WORK SPACE

_____ cubic feet

STARTER

**4** A crate of **hockey pucks** has 6 pucks in a row, 4 rows in a layer and 5 layers. How many pucks are in the crate?

WORK SPACE

_____ pucks

PRO

**5** The bottom of a **basketball** cart has an area of 12 square feet. The cart is 3 feet tall. What is its volume?

WORK SPACE

_____ cubic feet

PRO

**6** A helmet bin has a volume of 60 cubic feet. It is 5 feet long and 3 feet wide. How **tall** is it?

WORK SPACE

_____ feet

ALL-STAR

**7** The red bin is 6 ft by 2 ft by 3 ft. The blue bin is 4 ft by 4 ft by 2 ft. Which bin holds **more**? How much more?

WORK SPACE

_____ bin, by _____ cubic feet

CHALLENGE ★

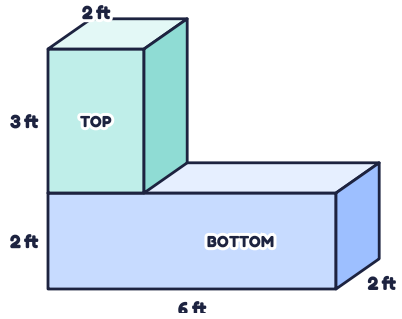
**8** Challenge: A box shaped like a **cube** has a volume of 64 cubic feet. How long is each edge?

WORK SPACE

_____ feet

## A The Stick Rack

The Comets' hockey stick rack is made of two boxes. Split it into parts, find each volume, then add.




1. Find the volume of the **bottom** part (the long blue box).
   _____ **cubic feet**
2. Find the volume of the **top** part (the tall box). It sits on the left end of the bottom part.
   _____ **cubic feet**
3. What is the volume of the **whole** stick rack?
   _____ **cubic feet**

## B Fill the Bin Table

Each row is one bin. Fill in every empty box. Sides are in feet and volumes are in cubic feet. Use V = l × w × h.

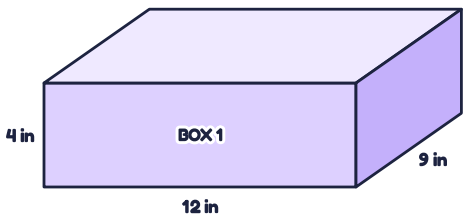
| BIN | LENGTH | WIDTH | HEIGHT | VOLUME |
|---|---|---|---|---|
| 1 Tape bin | 3 | 2 | 2 | |
| 2 Ball bin | 5 | | 2 | 30 |
| 3 Glove bin | 4 | 3 | | 24 |
| 4 Cone bin | | 2 | 3 | 36 |

**Missing side?** Multiply the two sides you know. Then ask: that number times **what** equals the volume?
Example: 2 × 5 = 10, and 10 × 4 = 40, so the missing side is 4.

## C Pack the Puck Box

An official hockey puck is 1 inch thick and 3 inches across. The coach packs pucks flat into boxes.

**BOX 1 · 12 IN × 9 IN × 4 IN**







**OFFICIAL PUCK**
lies flat in a
3 in × 3 in × 1 in space

1. How many pucks fit in **one layer** on the bottom of Box 1?
   WORK SPACE
   _____ **pucks**
2. Each puck is 1 inch thick. How many **layers** fit in Box 1?
   WORK SPACE
   _____ **layers**
3. How many pucks fit in Box 1 **in all**?
   WORK SPACE
   _____ **pucks**
4. Box 2 is 6 in by 6 in by 10 in tall. Which box holds more pucks? How many more?
   WORK SPACE
   **Box** ____ **by** ____ **pucks**

**BONUS · DESIGN A BIN**

The Comets need a new bin with a volume of exactly **24 cubic feet**. Write two different sets of length, width and height that work.

1. _____ ft × _____ ft × _____ ft
2. _____ ft × _____ ft × _____ ft

# Answer Key (for teachers & parents)

Answers for **Equipment RoomVolume**, with the work shown. Print pages 1 and 2 for students and keep this page for checking. Accept "cubic units" or "cubic feet" written as cu ft or ft³. The puck size is the real official size; the teams and bins are made up.

## Page 1 Problems

1. **Answer: 12 cubes**
   3 × 2 = 6 cubes in a layer; 2 layers; 6 × 2 = 12
2. **Answer: 24 cubic units**
   4 × 3 = 12 in a layer; 12 × 2 = 24
3. **Answer: 30 cubic feet**
   5 × 2 × 3 = 30
4. **Answer: 120 pucks**
   6 × 4 = 24 in a layer; 24 × 5 = 120
5. **Answer: 36 cubic feet**
   V = B × h; 12 × 3 = 36
6. **Answer: 4 feet**
   5 × 3 = 15; 15 × 4 = 60
7. **Answer: Red bin, by 4 cubic feet**
   red 6 × 2 × 3 = 36; blue 4 × 4 × 2 = 32; 36 – 32 = 4
8. **Answer: 4 feet**
   4 × 4 × 4 = 64

## A · The Stick Rack

1. **Answer: 24 cubic feet**
   6 × 2 × 2 = 24
2. **Answer: 12 cubic feet**
   2 × 2 × 3 = 12
3. **Answer: 36 cubic feet**
   24 + 12 = 36

## Quick score

| | |
|---|---|
| Page 1 problems | _____ / 8 |
| A · The Stick Rack | _____ / 3 |
| B · Fill the Bin Table | _____ / 4 |
| C · Pack the Puck Box | _____ / 4 |
| **Total** | **_____ / 19** |

## Skills practiced

Volume · Unit cubes · l × w × h · Base × height · Missing dimension · Composite figures · Comparing volumes · Packing in layers

**Teaching tip:** Build Prism A with snap cubes or sugar cubes first. Ask students to count one layer, then stack layers. Once they see "layer × layers," the formula l × w × h makes sense on its own.

## B · Fill the Bin Table

1. **Answer: Tape bin volume 12**
   3 × 2 × 2 = 12
2. **Answer: Ball bin width 3**
   5 × 2 = 10; 10 × 3 = 30
3. **Answer: Glove bin height 2**
   4 × 3 = 12; 12 × 2 = 24
4. **Answer: Cone bin length 6**
   2 × 3 = 6; 6 × 6 = 36

## C · Pack the Puck Box

1. **Answer: 12 pucks**
   12 ÷ 3 = 4 across, 9 ÷ 3 = 3 deep; 4 × 3 = 12
2. **Answer: 4 layers**
   4 inches tall ÷ 1 inch = 4
3. **Answer: 48 pucks**
   12 × 4 = 48
4. **Answer: Box 1, by 8 pucks**
   Box 2: 2 × 2 = 4 in a layer, 10 layers, 40 pucks; 48 – 40 = 8

Bonus (not scored): answers vary, such as 4 × 3 × 2, 6 × 2 × 2, 2 × 2 × 6, 8 × 3 × 1 or 24 × 1 × 1.



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